If we suppose the polar horizontal parallax diminished 4″, conformably to Laplace's theory, it would increase the longitude of Porto-Rico by 8″ 5 of time: in this case the longitude of Porto-Rico would be $(=4^h\ 33'\ 51''\ 2+8''\ 5)=4^h\ 33'\ 59''\ 7$

According to Triesnecker. 4 33 58 6

The variations in the elements, have no sensible influence on the difference of meridians between the observations in Europe.—So that we may consider the above results to have as much accuracy as the observations can possibly be susceptible of.

No. XXXVII.

The geographical position of sundry places in North America and in the West Indies, calculated from astronomical observations: By Jose Joaquin de Ferrer.

Read at sundry times, 1805.

OCCULTATION OF JUPITER BY THE MOON.

January 15th, 1799.

Observations.		Apparent time: h ′ ″
At New-Orleans by Mr. Andrew Ellicott.	Immersion of the center of Jupiter. .	5 45 46 5
	Emersion of the center. . . .	7 06 20 0
At the royal observatory of the Island of Leon by Don Julian Ortiz Canelas.	Immersion of the 1st limb. . . .	13 29 43 8
At the national observatory at Paris by Mr. Mechain.	Immersion of the center. . . .	13 50 12 5

Elements by the tables at $13^h\ 00'\ 00''$ mean time or $12^h\ 49'\ 50''\ 1$ apparent time at Paris.

		° ′ ″
Moon's	Longitude reckoned from the apparent equinox. . .	46 26 38
	Latitude. S.	34 26 7
	Equatorial horizontal parallax.	55 04 0
	Horizontal diameter—3″ inflection. . . .	20 00 0
	Horary motion in longitude.	30 27 7
	Horary motion in latitude northerly. . . .	2 41 1
	Horary augmentation of parallax. . . .	1 4

		° ′ ″
Jupiter's	Geocentric longitude.	46 24 46
	Geocentric latitude.	57 16
	Horary motion in longitude direct. . . .	2 40
	Horizontal parallax.	1 87
	Semidiameter.	20 33

Proportion of the equatorial and polar diameters of the earth 334 : 333.

	New-Orleans. Im. of center.	New-Orleans. Em. of center.	Island of Leon. Im. 2d limb.	Paris. Im. of center.
	h ′ ″	h ′ ″	h ′ ″	h ′ ″
Apparent time of the observations,	5 45 46 5	7 06 20	13 29 43 8	13 50 12 5
Longitude west from Paris,	6 10 16	6 10 16	34 08 0	00 00 0
Apparent time at Paris,	11 56 02 5	13 16 36	14 03 51 8	13 50 12 5
Latitude—Vertical angle,	29 48 34		36 18 00	48 40 01
Parallax in longitude,	11 18 6	3 54 3	51 34 0	46 01 0
Parallax in latitude,	18 02 5	12 26 7	18 41 0	29 42 4

Apparent inclination of the orbit for New-Orleans,	19° 45′ 01″		
Conjunction at New-Orleans, apparent time,	6h 37 53 1		
Difference of latitudes at the conjunction,	22 11 4		
Idem by the tables,	22 43 9		
Correction of the tables,	— 32 5		

	h ′ ″
Conjunction at Paris, by the observation on the Island of Leon apparent time,	12 47 42 2
Do. by the observation of Mr. Mechain,	12 47 35 8
Mean	12 47 39 0
At New-Orleans,	6 37 53 0
Longitude of New-Orleans West from Paris.	6 09 46 0

Table of the results of longitude by the lunar distance observed with a circular reflector.

Capital of Porto-Rico.

1796	Apparent time. h ′ ″	Apparent distances of ☾ from ⊙ and stars.	☾ and ⊙ nearest limb. ° ′ ″	Long. W. from Paris. h ′ ″
January 30	20 20 41	and ⊙ nearest limb.	93 29 52	4 32 53
31	20 48 15	. . . .	82 32 12	4 33 00
February 2	23 22 02	. . . .	59 50 10	4 33 15
3	20 53 21	. . . .	49 39 36	4 33 18
4	0 20 36	. . . .	48 42 36	4 33 47
12	22 48 28	. . . .	58 38 42	4 33 06
	23 3 29	. . . .	58 46 18	4 33 14
14	3 44 06	. . .	73 38 15	4 33 47
15	4 38 0	. . . .	87 09 18	4 34 32
16	0 57 34	. . . .	98 54 02	4 33 42
March 2	21 17 31	. . . .	70 14 20	4 32 44
	21 27 31	. . . .	70 11 40	4 32 39
3	21 11 11	. . . .	59 6 42	4 33 11
	21 20 14	. . . .	59 4 40	4 32 35
4	22 58 18	. . . .	47 14 18	4 33 22
11	22 48 48	. . . .	40 56 54	4 33 02
13	22 59 39	. . . .	67 36 45	4 33 32
	23 08 02	. . . .	67 41 22	4 33 09
14	23 41 33	. . . .	81 11 45	4 34 08
	23 51 19	. . . .	81 17 42	4 34 17
			Mean	4 33 21 4
Correction of the Epochs,				+ 35 0
Longitude of Porto-Rico West from Paris				4 33 56

Table of the results of longitude continued.

New Veracruz.

1792	Apparent time. h ′ ″	Apparent distances of ☾ from ☉ and stars.	° ′ ″	Long. W. from Paris. h ′ ″
Septembr. 21	0 16 2	☉ and ☾ nearest limbs.	66 55 45	6 32 54
	0 38 48	. . . .	67 5 45	6 32 0
28	10 56 24	α aquilæ & ☾ nearest limb	57 56 45	6 32 47
	11 05 44	. . . .	57 59 15	6 32 47
October 2	11 40 52	α ♉ and ☾ nearest limb.	19 50 58	6 33 38
	11 54 28	. . . .	19 45 56	6 33 43
3	12 00 25	. . . .	6 54 07	6 33 51
	12 17 56	. . . .	6 47 34	6 33 42
4	11 42 26	α ♉ and ☾ remote limb.	5 28 00	6 33 44
	11 54 53	. . . .	5 33 16	6 33 57
9	23 6 57	☉ and ☾ nearest limbs.	61 13 00	6 33 47
	23 40 57	. . . .	61 1 45	6 33 32
11	22 17 09	. . . .	38 38 00	6 32 44
12	0 31 19	. . . .	37 57 16	6 33 51
	0 43 14	. . . .	37 53 22	6 33 35
19	3 15 12	. . . .	50 48 39	6 33 09
	3 46 02	. . . .	50 48 04	6 33 05
November 4	21 11 14	. . . .	104 5 45	6 32 46
	21 23 54	. . . .	104 1 8	6 32 57
5	21 44 02	. . . .	93 0 26	6 32 08
	21 53 23	. . . .	92 56 54	6 32 42
18	3 13 41	. . . .	59 49 40	6 33 07
	3 24 23	. . . .	59 53 10	6 32 57
21	2 46 22	. . . .	99 16 37	6 32 45
	2 55 51	. . . .	99 20 45	6 32 40
December 17	3 50 55	. . . .	54 52 45	6 33 4
			Mean.	6 33 09
		Correction of the Epochs,		+ 39
		Longitude of Veracruz west from Paris,		6 33 48

The preceding Table contains observations of distances of the moon from the sun and stars in Vera Cruz and Porto-Rico, and the number of observations being equal on the east and west of the moon, the errors of them must be very nearly destroyed.

The longitudes are deduced by a comparison with the nautical almanac; and to the mean of the results I have added the corrections which are found in the tables, arising from the following considerations.

The tables of Mason which have been used for the calculations of the moon in the nautical almanac, suppose the epoch of the mean longitude of the moon in 1750 6ˢ 08° 22′ 21″

The secular motion. 10 07 53 35

From a comparison with the new tables, the following corrections arise.

Correction of epochs in 1750	— 13″ 0
Idem of the secular equation.	= 54 96

Coefficient of Mr. Laplace=15″ sin (☾'s apog. + 2 long. ☌—3 ☉'s apog.)

To determine the error of the solar tables, I have calculated various observations of the Rev. Nevil Maskelyne corresponding to the epochs of observations in the said tables.

I have further applied the equation XVIII of the lunar tables, of which no use is made in the calculations of the nautical almanac. The result of all the corrections, I have reduced to time, to apply it to the mean of the results of longitude as I have mentioned above.

Difference of longitude between Paris and Veracruz.

Veracruz, apparent time.		h ′ ″		
1795, Aug. 8. Emer. I Sat. of ♃		8 53 45 2		
14	II.	8 57 29 8	difference of longitudes, by the comparison of the observations in Europe.	h ′ ″ 6 33 32 0
Oct. 9	I.	8 03 00 8		
10	II.	5 58 55 5		
25	I.	6 26 32 1		
By 26 series of ☾'s distances (page 223)				6 33 48 0
By the occultation of o Sagittarius by the ☾(page 160, Vol. VI, part I.)				6 33 42 8
Longitude of Veracruz west from Paris.				6 33 40 9

Veracruz and Havanna.

	h ′ ″
Aug. 8. 1795 Em. I Sat of ♃ observed at Havanna by Don Cosme Churruca.	9 48 50 7
Observed by me at Veracruz.	8 53 45 2
Difference of longitudes.	0 55 05 5
Difference of longitudes by the cronometer. . . .	55 02 5
Veracruz west from Havanna. Mean.	0 55 04 0

Capital of Porto-Rico and Paris.

	h ′ ″
By 20 series of ☾'s distances (page 222)	4 33 56
By 4 series of ☾'s distances compared with the observations of the Rev Nevil Maskelyne at Greenwich, on Jan. and Feb. 1796.	4 33 42
By the occultation of *a* ♉ by the ☾. Oct. 21, 1793. (page 220)	4 33 52
Porto-Rico west from Paris. Mean.	4 33 50

Havanna and Paris.

		Mean time. h ′ ″
Jannary 26. 1800. Emer. of I Sat. of ♃ observed at Havanna.		6 36 30
Vivier.		12 24 20
		5 47 50
Vivier east from Paris.		9 24
Havanna west from Paris.	h ′ ″	5 38 26
Veracruz west from Paris.	6 33 40 9	
Havanna east from Veracruz.	55 04 0	
Havanna west from Paris.		5 38 36 9
Porto-Rico west from Paris.	4 33 50	
Havanna west from Porto-Rico by the Cronometer.	1 4 44	
Havanna west from Paris.		5 38 34
Mean.		5 38 32 3

Natchez and Paris.

	h ′ ″
New-Orleans west from Paris by the occultation of Jupiter by the ☾ (p. 222)	6 09 46
Natchez west from New-Orleans by the Cronometer.	5 16
Natchez west from Paris.	6 15 02

Occultation of the I *Satellite of Jupiter by the moon, observed at New-Orleans by Mr. Andrew Ellicott, and at the Royal Observatory of the Island of Leon by Don Julian Ortiz de Canelas, on the* 15*th of January,* 1799.

I have sent to the American Philosophical Society the result of this occultation, which was observed the same day in the island of Leon and at New-Orleans. This determination besides being very exact, has appeared to me to merit attention, was it for no other reason than that it appears to be the first time that the longitude has been deduced from such an observation; at least I have not had any knowledge of its having been done before.

	New-Orleans.		Island of Leon.
	Immersion.	Emersion.	Immersion.
	h ′ ″	h ′ ″	h ′ ″
Apparent time.	5 41 40	7 02 34	13 25 35
Longitude west of Paris.	6 9 56	6 4 56	34 8
Apparent time at Paris.	11 51 36	13 12 30	13 59 43
Distance of the ☾ from the nonagesime.	13°07′ 53″	3°20′ 12″	83°26′ 57″
Altitudes of the nonagesime.	71 23 50	77 26 30	70 24 10
Horiz. parallax. of the ☾ corresponding to the lat.—horiz. parallax of the I Sat.	54 58 1	55 00	55 00 0
Parallax in longitude.	12 00 4	3 10 4	31 33 4
Parallax in latitude.	18 20 3	12 40 5	18 30 8
Apparent semidiameter of the ☾—inflection.	15 13 4	15 14 0	15 01 0
Distance of the I Satellite from Jupiter.	7ˢ 09° 5′	7ˢ 20° 32′	

	h ′ ″
Result.—Conjunction in New-Orleans.	6 34 54 1
Difference of the latitudes at the conjunction. .	. 22 01 2
By the tables.	22 36 0
Sum of the errors.	34 8

	′ ″
Difference of apparent latitudes at the moment of immersion in the island of Leon.	=7 24 8
Errors of the tables according to the observations at New-Orleans.	— 34 8
Difference of the apparent latitudes at the immersion.	6 50 0

	h ′ ″	W. of Paris. h ′ ″	Greenwich. h ′ ″
Conjunction in the Island of Leon.	12 10 39		
Idem. New-Orleans.	6 34 54		
Difference of Meridians.	5 35 45	6 09 53	6 0 33
Result by the occultation of ♃	5 35 48	6 09 56	6 0 36

Note, The horizontal parallax of the moon in this calculation, as also in the calculation of Jupiter, supposes the constant equatorial 57′ 01″ 0.

Ratio of the equatorial and polar diameters of the earth as 334 : 333.

The parallax of I Sat.= horiz. parallax of Jupiter=1″ 9

Horary motion of the moon at New-Orleans+horary geocentric motion of I Sat. of Jupiter=30′ 37″ 6.

At the Island of Leon 30′ 37″ 7—horary motion of the Satellite during the observations, which was retrogade.

Inclination of the orbit of I Satellite. 3° 18′ 38″

Position of the node idem. 10° 14 30

Passage of Mercury over the disk of the Sun, May 7th, 1799. *Calculated by Jose Joaquin de Ferrer.*

The principal object of this memoir, is to determine the longitude of Miller's Place on the river Coenecuch (Am. Phil. Trans. Vol. V. p. 197.) by the *Egress* of Mercury observed by Mr. Andrew Ellicott, Commissioner on the part of the United States to fix the line which should divide them from the Possessions of Spain.

The position of this point is interesting to Geography and Navigation, from its vicinity to Pensacola and the head of the river Perdido. According to the map of Mr. Lafon, which has this point laid down, Pensacola is 28″ of time east of *Miller's Place,* and the river Perdido 46″ of time west of *Miller's Place.* I have calculated fifteen observations of ingress and thir-

teen of egress observed in Europe, and comparing each of these observations with the mean determination for Paris, it appears that the greatest error in longitude has twice been at 8″ of time. The errors of the mean of the observations of the time of the ingress and egress, seems to be within 3″, as may be seen in the table. Mr. Ellicott's observation appears worthy of the utmost confidence and he says that the exterior contact is within the limits of half a second. By the European observations it will be seen, that the time employed by the diameter of Mercury in the egress = 3′ 02″, 1 and according to Mr. Ellicott's observations = 3′ 05″, 5 which proves that both contacts were well observed: taking the mean, the uncertainty appears to be 1″ 7 and, all circumstances considered, the error of longitude can scarcely equal 6″ of time.

From the new tables of Mr. Lalande.

	h ′ ″
Conjunction in the ecliptic.	1 04 36
☉'s true longitude from the mean equinox.	46 54 17 3
☿'s Helioncentric latitude. S.	5 47 470
☉'s aberration =—19″ 80; nutation =—12″ 6	
☿'s aberration in longitude. =+ 6 85; aberration in latitude =— 3 28	
☉'s horary motion.	144 926
☉ and ☿ relative geocentric horary motion in the interval between the ingress and egress.	235 926
☿'s horary motion in latitude.	43 607
☉ and ☿'s relative horary motion between the ingress and the time of the conjunction.	235 866
——————between the egress and the conjunction.	235 984
☿'s horizontal parallax—☉'s horizontal parallax at the time of the ingress	7 089
do. do. egress	7 109
Equation of time at the ingress.	—3 43 0
do. egress.	—3 44 2
½ diameter of the sun.	15 51 8

Observations made in Europe, May 7th, 1799. *Mean time*

		Limb.	Ingress of ☿ h ′ ″	Egress of ☿ h ′ ″	′ ″	′ ″
Mr. de Lambre.	Paris.	1	21 17 09 6	4 38 04 4	3 00 2	3 00 9
		2	21 20 09 8	4 41 05 3		
Mr. Mechain.	Paris.	1	. . . . .	4 38 20 0	. . . .	2 59 0
		2	21 19 52 7	4 41 19 0		
Mr. Messier.	Paris.	1	21 16 41 0	4 38 22 0	3 10 0	3 08 0
		2	21 19 51 0	4 41 30 0		
	Island of Leon.	1	. . . . .	4 03 58 3		
		2	20 46 06			
	Marseilles.	1	. . . . .	4 50 26		
		2	21 32 11			

	Limb.	Ingress of ☿ h ′ ″	Egress of ☿ h ′ ″	′ ″	′ ″
Mirepoix.	1	21 15 24	4 36 15	2 46	2 50
	2	21 18 10	4 39 05		
Berlin.	1	22 00 28	5 22 17	3 18	3 18
	2	22 03 46	5 25 30		
Naples.	1	22 04 03 6	5 25 20	3 14	3 21
	2	22 07 17 6	5 28 41		
Bremen.	1	31 42 34 3	5 03 57	2 05 7	
	2	21 45 40 0			
Hamburg.	1	. . . . .	5 08 39		
	2	21 50 02			
Dresden.	1	22 02 12	5 22 37	3 00	2 57
	2	22 05 12	5 26 34		
Messersdoff.	1	. . . . .	5 31 16		3 08
	2	22 12 37	5 34 24		
Gotha.	1	21 50 11		3 03	
	2	21 53 14 2 . . .			
Lilienthal.	1	21 42 52 7 . . .		2 53 9	
	2	21 45 46 6 . . .			
Madrid.	2	20 56 00 0			
Dantzick.	1	. . . . .	5 43 18		
Breslaw.	1	. . . . .	5 36 51	. . . .	3 01 0
	2	22 15 15	5 39 52		
			Mean.	3 03 7	3 04 0

Mean of the best observations. . . . . 3′ 02″ 2
Time of the passage of the ½ diameter of ☿ 1 31 1

By the mean result of three observations for the meridian of Paris, h ′ ″
the Ingress reduced to the center of the earth was. . . . 21 17 41
the Egress. 4 41 18

Duration.. . . 7 23 37

Semidiameter of the ☉=950″ ☾=10° 28′ 18″

		° ′ ″	
l=Appt. latitude of ☿ for the center of the earth at the Ingress=			173 44 by observ
l′= ditto	ditto	Egress.=	495 84 ditto.
E=Elongation at the Ingress.		=	934 034 ditto.
E′= ditto	Egress.	=	810 226 ditto.
☊=Inclination of the orbit at the Ingress.		=10 27 55	
☊′= ditto . .	Egress.	=10 28 40	
h=Horary relative motion at the Ingress.		=	235 818
h′= ditto . .	Egress.	=	236 026

$a = \frac{3600}{235\ 818}$ $a' = \frac{3600}{236\ 026}$

P=Parallax in longitude. Q= ditto latitude.
π =Coefficient of the Parallax in longitude at the Ingress.
Π= ditto. latitude Ingress.
π' = ditto. longitude Egress.
Π'= ditto latitude Egress.

$$\pi = \frac{E}{E + l.\ \text{tang.}\ \ominus} \times a = 15{,}8072$$

$$\Pi = \frac{l}{E - l.\ \text{tang.}\ \ominus} \times a = 2{,}9354$$

$$\pi' = \frac{E'}{E' + l'\ \text{tang.}\ \ominus'} \times a' = 13{,}7041$$

$$\Pi' = \frac{l'}{E' - l'\ \text{tang.}\ \ominus'} \times a' = 8{,}3865$$

Ingress for the center of the earth=apparent Ingress—15,8072 P—2,9354 Q
Egress . . ditto. . =apparent Egress —13,7041 P+8,3865 Q

TABLE.

		P	Q	d h
				′ ″
Paris.	I.	+1,716	+4,780	−0 41 0
	E.	−5,584	+3,216	+1 43 5
Island of Leon	I.	+3,266	+4,000	−1 03 4
	E.	−5,805	+1,687	+1 33 7
Marseilles.	I.	+1,987	+4,167	−0 43 6
	E.	−5,990	+2,649	+1 44 3
Berlin.	I.	+0,750	+4,700	− 25 6
	E.	−5,550	+3,855	+1 49 1
Mirapoix.	I.	+2,235	+4,370	− 50 1
	E.	−5,820	+2,540	+1 41 0
Bremen.	I.	+1,002	+4,890	−0 29 8
	E.	−5,527	+3,762	+1 47 7
Breslaw.	I.	+0,654	+4,500	−0 23 2
	E.	−5,574	+3,732	+1 45 9
Naples.	I.	+1,542	+3,620	−0 35 2
	E.	−6,337	+2,540	+1 48 1
Dresden.	I.	+0,830	+4,600	−0 26 6
	E.	−5,700	+3,670	+1 48 5
Hamburg.	I.	+1,000	+4,880	−0 29 4
	E.	−5,527	+3,762	+1 47 3
Messersdoff.	I.	+0,770	+4,500	−0 26 0
	E.	−5,740	+3,640	+1 48 5
Madrid.	I.	+2,730	+4,249	−0 55 6
Gotha.	I.	+1,006	+4,327	−0 29 3
Lilienthal.	I.	+1,002	+4,860	−0 29 8
Dantzick.	E.	−5,531	+4,047	+1 49 3

Paris.	I	E	L	I′	E′	L′	d L
	h ′ ″	h ′ ″	h ′ ″	h ′ ″	h ′ ″	h ′ ″	″
Mess & Delambre	21 17 58	4 41 19	0 0	21 17 58	4 41 19	— 9	9
Messier.	21 17 41	4 41 34	0 0	21 17 41	4 41 34	+ 5	5
Mechain.	21 17 39	4 41 35	0 0	21 17 39	4 41 35	+ 5	5
Island of Leon	20 43 31	4 07 03	+34 08	21 17 39	4 41 11	34 15	7
Marseilles.	21 29 56	4 53 41	−12 08	21 17 48	4 41 33	12 16	8
Mirapoix.	21 15 49	4 39 27	1 51	21 17 40	4 41 18	1 50	1
Berlin.	22 01 41	5 25 42	44 10	21 17 31	4 41 32	44 10	0
Naples.	22 05 05	5 28 48	47 26	31 17 39	4 41 22	47 25	1
Bremen.	21 43 37	5 07 15	25 51	21 17 46	4 41 24	25 54	3
Dresden.	22 03 15	5 26 54	45 27	21 17 48	4 41 27	45 32	5
Breslaw.	22 16 22	5 40 09	58 51	21 17 31	4 41 18	58 44	7
Hamburg.	21 48 02	5 11 57	30 32	21 17 30	4 41 25	30 33	1
Madrid.	20 53 33		24 09	21 17 42		24 04	5
Gotha.	21 51 14		33 35	21 17 39		33 37	2
Lilienthal.	21 43 46		26 16	21 17 30		26 09	7
Dantzick.		5 46 38	1 05 15		4 41 23	1 5 13	2
Messersdoff.	22 10 40	5 34 38				53 07	
Mean.				21 17 40	4 41 25		
Mean of the best observations. . .				21 17 37	4 41 27		

NOTE.

P=parallax in longitude. Q=parallax in latitnde.

d h = Reduction to the center of the earth in time.

I=Ingress of the center of Mercury corresponding to the center of the earth.

E=Egress.

L=Longitudes from the meridian of Paris, from the best authorities.

I′ and E′=Ingress and Egress for the meridian of Paris, reduced to the center of the earth.

L′=Longitudes resulting from the observations of the ingress and egress, supposing they happened in Paris 21h 17′ 37″ and 4h 41′ 27″ as appears from the best observations.

d L=Difference of longitudes of the columns L and L′ or errors of the observations in longitudes, supposing the longitudes in the column L to be exact.

Egress of Mercury by Mr. Andrew Ellicott, at Millers Place, Coenecuch River.

	° ′ ″	
Latitude.	30 49 33	
Corrected latitude supposing the ratio of the polar and equatorial diameters of the earth=333 : 334	30 40 28	
Interior contact 6th of May, 1799. Mean time.	22 41 19	(a)
Exterior contact. Certain to ½ second.	22 44 24 5	(a)
Mean=to the egress of the center of ☿.	22 42 51 7	
Longitude from Paris by an approximated calculation. . .	5 58 30	
Mean time in Paris May 7th.	4 41 21 7	

(a) Magnifying power 200

	h ′ ″
Equation of time=—3′ 44″ 2. ⊙'s right ascension=	2 58 19
Horizontal parallax of ☿—horizontal parallax of the ⊙=	7 117
P=Parallax in longitude.	+ 1.316
Q=Parallax in latitude.	+ 2 268

	h ′ ″	″	″	h ′ ″
Egress reduced to the center of the earth=	22 42 51 7	—13,7041 P	+8,3865 Q=	22 42 52 7
Egress ditto. . observed in Paris.				4 41 27 0
Longitude of Miller's Place west from Paris.				5 58 34 3

Pensacola 28″ time east from Miller's Place.
Rio Perdido 46 do. west from Miller's Place.

	h ′ ″	″	h ′ ″		° ′ ″
Pensacola west from Paris=	(5 58 34 3	—28)=	5 58 06	latitude	30 24 00
Source of Rio Perdido. =	(5 58 34 3	+46)=	5 59 20	. .	30 42 00
Miller's Place.			5 58 34 3	. .	30 49 33

	h ′ ″	° ′ ″
Pensacola west from Greenwich. . .	5 48 46	= 87 11 30
Rio Perdido.	5 50 00	= 87 30 00
Miller's Place.	5 49 14 3	= 87 18 30

Determination of the tabular error in latitude, by observations of distances of limbs, observed at the observatory of the Island of Leon with a heliometre and reduced to the diameter of the sun 31′ 43″ 6. The observations published in the nautical almanac of the Island of Leon are made before and after the apparent conjunctions.—It is to be observed, that the distance stated 1ʰ 38′ 16″ involves without doubt an error of the press, of 20″, which is easily noticed by a comparison with the other distances. To compare the observations with the Tables, I have calculated the following table of the parallaxes of longitude and latitude.

Appt. time in the Island of Leon. h ′ ″	Par. in Long. ″	Par. in Lat. ″
22 00 00	+2 02	+3 29
23 00 00	+0 74	+2 75
00 00 00	−0 66	+2 27
1 00 00	−2 11	+1 90
2 00 00	−3 49	+1 67
3 00 00	−4 70	+1 58
4 00 00	−5 67	+1 66

	h ′ ″	h ′ ″	
Mean of three series of of observations; apparent time .	23 44 09	2 07 25	
Eqn. of time=−3′ 44″ diff. of mer. 34′ 08″ mean time in Paris.	00 14 33	2 03 41	
Distance of the centers of ⊙ & ☿ by the mean of three observs.	6 25 00	0 8 44	3
Parallax in longitude	−0 27	−3	62
Parallax in latitude	+2 40	+1	66
Latitudes by the tables	5 07 82	6 51	56
Difference of apparent longitudes.	566 80		
Idem. latitudes	103 40		
Inclination of the apparent orbit=10° 20′ 19″			
Chord	576 155		
Angle of conjunction at 23h 44′ 09″ = 52° 05′ 48″			

Apparent conjunction for the center of the earth in mean time.

	h ′ ″
In the Island of Leon	0 40 38
In the Ecliptic	0 33 52
Corresponds at Paris to	1 08 00
Correction of the tables in latitude . . .=−	6 4

These observations are more proper to determine the latitude than the conjunction, on account of being very near the apparent conjunction.

Four series of observations (the most to be depended upon) made in the Island of Leon, give the following mean results.

	h ′ ″		h ′ ″
Conjunction in the Ecliptic.	0 33 52		
	0 34 12		
	0 34 16	Mean.	0 34 02
	0 34 02	Longitude	0 34 08
Conjunction in the ecliptic for Paris by the observation of distances.			1 08 10

Errot of the tables in latitude =	−6″ 4		
	−7 0		
	−6 0	Mean =	−6″ 3
	−6 0		

Mr. Messier found the nearest distance of the centers . .	=	5′ 45″
and the diameter of the ⊙ . .	=	15 56
The distances of the limbs should have been observed . . .		10 11

	′ ″	′ ″	′ ″	
Distance of the limbs =	31 43 6 ×	10 11	=	10 08 31
	32 56			
½ Diameter of the ⊙ . . .			=	15 51 80
Apparent distance of the limbs . .			=	5 43 45

At Berlin the observed nearest distance, corrected from the influence of refraction and parallax, was . . . . . 5° 40″ 38
(Mem. of the R. Academy of Berlin.)

By the above data we find the following error of the tables in latitude.

By the observation of Mr. Messier	— 5″ 77
Idem. at Berlin.	— 5 77
Idem. in the Island of Leon.	— 6 30
Mean error.	—5 8

Determination of the diameters of the Sun and Mercury, conjunction in the Ecliptic and error of the tables in longitude.

		h ′ ″	
Ingress at Paris for the center of the earth, from the mean of the observations most to be depended upon . . .		21 17 37	
	Egress.	4 41 27	
	Duration.	7 23 50	
Difference of apparent elongations	= 1745″ 18		
Apparent latitude of Mercury by the tables at the ingress	179 31		
Correction in latitude	— 5 80		
Apparent latitude of ☿	173 51		
		° ′ ″	
Inclination of the orbit		10 28 18	
Chord		1774 643	
Hence nearest distance of the centers	=	5 40 44	
Angle of conjunction at the ingress.	= 79	28 52	
½ Diameter of the sun resulting from above . . .		15 50 34	
Logarithm $\frac{\text{distance of the } \odot \text{ at the time}}{\text{Apogee—distance of the } \odot}$ = 9,9971062			
Apogee diameter of the ⊙, resulting therefrom . .	= 31′ 28″ 0		
Time employed by the diameter of Mercury in the ingress and egress.	= 3 01 1		
Logarithmic distance of Mercury at the conjunction. = 9,74550			
Hence the diam. of ☿ reduced to the mean distance of the earth from the ⊙ = 6″ 2988			
Apparent elongation at the ingress . . =	934 416		
Aberration of the ⊙—aberration of ☿ . =	26 662		
Elongation in the ecliptic	907 775		
Conjunction in the ecliptic; mean time of Paris . . .	=1h 08′ 32″		
Geocentric latitude of Mercury, corrected from aberration .	= 5 44 55		
Correction of the tables to the longitude of Mercury supposing the longitude of the ⊙ to be exact. . .	=+ 15 52		
Longitude of the ⊙ from the mean equinox at the conjunction. =	1 16 54 26 7 =		
Heliocentric longitude of Mercury	7 16 54 26 7		